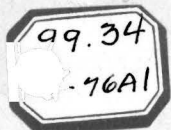


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ALLEGHENY FOREST EXPERIMENT STATION*

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PRUNING WOUNDS AS AN AVENUE OF ENTRANCE FOR *STEREUM SANGUINOLENTUM*

3.33

IN NORTHERN WHITE PINE PLANTATIONS

by Bailey Sleeth**

A reconnaissance of a number of northern white pine plantations was made in Pennsylvania during the late summer of 1937. Observations were made on the prevalence of sporophores on old pruning wounds and on the size of such wounds. *Stereum sanguinolentum*, a wood-rotting fungus, was found to be fruiting abundantly on pruning wounds 2 to 5 years old and on the bark of recently dead trees. In several recently-pruned plantations sporophores of the fungus were present but not abundant. In plantations pruned 2 years previously, fruiting, when present, was generally confined to the lower portion of the wound. In plantations pruned 4 to 5 years previously, sporophores were frequently found distributed over the entire wound. This was the only wood-rotting fungus found fruiting on pruning wounds in the plantations visited.

The sporophores of *S. sanguinolentum* are thin, flat, and leathery, often forming patches on the wood and bark 1/2 to 2 inches across; usually a narrow thin shelf projects from the upper part. Shelving was very pronounced on sporophores observed on pruning wounds. The upper surface of the shelf is grayish and hairy. The lower or fruiting surface is smooth and colored pinkish buff to gray. When the fresh under-surface is bruised it turns blood red.

In three widely-separated plantations measurements were taken on those wounds with sporophores of *S. sanguinolentum*. Fruiting was found on a few wounds 2 inches and smaller in diameter. (Table 1) The largest number of wounds with sporophores was found in the 2-5.9 inches wide x 3-6.9 inches long classes. No data were taken on number and size of wounds with no fruiting. It was estimated that 20 percent of the trees with wounds larger than 2 x 3 inches had the fungus fruiting on one or more of them. In general, as the size of the wound increased, the percentage of wounds bearing sporophores increased. It is probable that a large number of wounds on which there were no sporophores were infected by the fungus.

* In cooperation with the University of Pennsylvania.

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Table 1.
Sporophores of Stereum sanguinolentum on
different-sized pruning wounds on northern white pine

Wound- width class (inches)	Wound-length class (inches)										Total
	1-1.9	2-2.9	3-3.9	4-4.9	5-5.9	6-6.9	7-7.9	8-8.9	9-9.9		
1-1.9	2	-	-	-	-	-	-	-	-	-	2
2-2.9	-	22	9	1	1	-	-	-	-	-	33
3-3.9	-	-	31	13	21	3	4	-	-	-	72
4-4.9	-	-	-	21	18	16	1	2	-	-	58
5-5.9	-	-	-	-	14	6	12	2	3	-	37
6-6.9	-	-	-	-	-	7	2	3	4	-	16
Total	2	22	40	35	54	32	19	7	7	-	218

An effort was made to determine the condition of the branch before it was cut and the method of removal. In most instances a saw was used; a few were cut with an axe. Apparently the sort of tool used in pruning had little influence on infection and subsequent fruiting of the fungus. It was often difficult to tell whether the branches were alive or dead when severed, but approximately 90 percent of them were judged to have been alive when cut. The percentage of live branches may actually have been much lower. In a number of cases the live wood and bark at the base of dead branches had been injured when pruned. This type of injury was most common directly below the branch and frequently provided a point of entry for the decay fungus.

A few northern white pines with S. sanguinolentum fruiting on pruning wounds were cut to determine the extent of fungal penetration and progress of decay. From 13 trees cut and dissected (Table 2) S. sanguinolentum was isolated at points 1 to 26 inches from the wound. No visible decay was observed in the trees with pruning wounds 2 years old, but it had progressed as far as 24 inches in the case of some of the 4 to 5-year-old wounds. The fungus was isolated from both heartwood and sapwood. The most rapid penetration occurred through the zone of heartwood-sapwood differentiation below the wounds. The maximum distance the fungus was isolated above the wounds was 12 inches compared to 26 inches below them.

Table 2.
Observations on 13 pruned northern white pine trees
that yielded Stereum sanguinolentum in culture

Wounds	Age of wounds	Size of wounds		Extent of		Penetration of fungus	
		Width	Length	Discol- oration	Decay	Average	Maximum
Number	Years	Inches	Inches	Inches	Inches	Inches	Inches
11	2	1-3	2-4	10	0	9	15
7	4-5	2-4	3-6	23	15	17	26

Stereum sanguinolentum must be considered an important wood-rotting fungus in the pruning of northern white pine, as well as of other conifers. In areas where this fungus, or other heart-rotting fungi, such as Fomes pini, are present, pruning of large branches increases the immediate chances of infection. Observations indicate that pruning of live branches larger than 2 inches must be considered hazardous; even branches down to 1 inch in size may provide entrance points for fungi, especially when improperly pruned. In the pruning of dead branches care should be exercised to prevent serious injury to the live wood at the base of the branch.

Young pruned trees in which this fungus is established are considered to be worthless long before they reach a merchantable size.^{1/} Young trees known to be infected with the fungus should be marked for early removal. In no case would it be advisable to select such trees for crop trees. Fruiting of the fungus on a wound is positive evidence that infection has occurred and that decay is progressing in the tree. The most effective means of keeping such losses at a minimum is to prevent or reduce the chances of infection of the pruned tree. In order to do this most effectively the influence of the following factors should be determined: (1) spacing, or density, (2) condition of branch, live or dead, (3) size of branch, (4) season of pruning, (5) rate of healing, (6) type and location of pruning wound, and (7) natural pruning.

^{1/} Spaulding, Perley, et al. Stereum sanguinolentum, a dangerous fungus in pruning wounds in northern white pine. Technical Note 19, U.S.D.A. Northeastern Forest Experiment Station, New Haven, Conn. 1935.